DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT Housing - Federal Housing Commissioner	STRUCTURAL ENGINEERING BULLETIN NO. 1132 Rev. 1 (Supersedes issue dated April 26, 2002)
TO: DIRECTORS, SINGLE FAMILY HOCs DIRECTORS, MULTIFAMILY HUBs	ISSUE DATE July 12, 2007
	REVIEW DATE July 12, 2010

SUBJECT: 1. **Item Description** PWI Joists

2. **Name and address of Manufacturer** Pacific Woodtech Corporation
Post Office Box 465
Burlington, WA 98233

This Structural Engineering Bulletin (SEB) should be filed with other SEBs and related Bulletins on materials or products as required by prescribed procedures.

General

This Bulletin sets forth specific requirements under the Technical Suitability of Products Program for determining the eligibility of housing to be constructed under HUD mortgage insurance, or other HUD housing programs.

2. Scope:

This Bulletin applies only to the structural features of this method of construction. Final determination of eligibility is made by the appropriate HUD Field Office. Other factors considered by the Field Office will be valuation, location, architectural planning and appeal, mechanical equipment, thermal characteristics, and market acceptance. Consideration is also necessary to determine whether a specific property will qualify under the specific HUD program, when constructed according to the method outlined in this Bulletin, and where the structure is to be located.

3. Minimum Property Standards (MPS):

Compliance with HUD MPS will be determined by the HUD Field Office or Homeownership Center on the same basis as submissions involving conventional construction, except for the special features described in this Bulletin.

4. Inspection:

Field compliance inspections covering conventional items of construction and any special features covered in this Bulletin shall be made in accordance with prescribed procedures.

The appropriate HUD Field Office or Homeownership Center shall furnish a copy of a HUD field inspection report to Headquarters, FHA Standards, Office of Manufactured Housing Programs, when there is:

a. Evidence of noncompliance with portions of the system of construction described in this Bulletin.

b. Faulty shop fabrication, including significant surface defects.

c. Damage to shop fabricated items or materials due to improper transportation, storage, handling or assembly.

d. Unsatisfactory field workmanship or performance of the product or system.

e. Any significant degradation or deterioration of the product or evidence of lack of durability or performance.

Periodic plant inspections will be made by HUD Field Office, Homeownership Center, State Agency personnel, or a HUD designated representative in accordance with their prescribed procedures. Factory inspection reports shall be submitted to HUD Headquarters, upon request.

5. Certification:

The manufacturer named in this Bulletin shall furnish the builder with a written certification stating that the product has been manufactured in compliance with the HUD Minimum Property Standards (MPS), except as modified by this Bulletin. The Builder shall endorse the certification with a statement that the product has been erected in compliance with the HUD MPS except as modified by this Bulletin, and that the manufacturer's certification does not relieve the Builder, in any way, of responsibility under the terms of the Builder's Warranty required by the National Housing Act, or under any provisions applicable to any other housing program. This certification shall be furnished to the HUD Field Office upon completion of the property.

OUTLINE DESCRIPTION, CATEGORY II CONSTRUCTION

GENERAL:

This bulletin provides for the use of PWI joists, manufactured by Pacific Woodtech Corporation for floor and roof spans up to 36 feet.

PRODUCT DESCRIPTION

PWI joists consist of laminated veneer lumber (LVL) or machine stress rated (MSR) lumber flanges and oriented strand board (OSB) webs. The webs are 8 foot long sections of OSB that are glued end to end to form a continuous web using a tongue-and-groove joint. The web-to-flange connection is made by gluing the web into a groove in the center of the flange face.

Flange stock used to fabricate PWI joists is LVL or MSR lumber of the grade required by the approved Pacific Woodtech Corporation *I-Joist Quality Control Manual*. Webs are structural use panels that comply with DOC Voluntary Product Standard PS-2. Exterior-type adhesives, complying with ASTM D 2559, are used for flange-flange, flange-web, and web-web joints.

Descriptive details for the various joist series are provided in Table 1

TABLE 1
JOIST DESCRIPTION

JOIST SERIES	JOIST DEPTHS (in.)		FLANGE			WEB	
	Minimum	Maximum	Material	Width (in.)	Depth (in.)	Material	Thickness (in.)
PWI-20	9½	11 7/8	LVL	1 3/4	1 3/8	OSB	3/8
PWI-30	9½	11 7/8	LVL	1½	1½	OSB	3/8
PWI-40	9¼	16	LVL	2 5/16	1 3/8	OSB	3/8
PWI-40	9½	16	MSR	2½	1½	OSB	3/8
PWI-50	9½	16	LVL	1 3/4	1½	OSB	3/8
PWI-60	9¼	16	LVL	2 5/16	1 3/8	OSB	3/8
PWI-60	9½	16	MSR	2½	1½	OSB	3/8
PWI-70	11 7/8	20	LVL	2 5/16	1½	OSB	3/8
PWI-77	9 ½	20	LVL	2 5/16	1½	OSB	7/16
PWI-90	9½	24	LVL	3½	1½	OSB	7/16
PWI-93	11 7/8	16	LVL	3½	1½	OSB	3/8

PWI joists are manufactured to meet the requirements of the Pacific Woodtech Corporation *I-Joist Quality Control Manual.* PWI joists are private-labeled for building material wholesalers and distributors, as well as for other I-joist manufacturers. All PWI joists marked with the name of the manufacturer (Pacific Woodtech) the manufacturer's mill number (1048) and the number of this Structural Engineering Bulletin (SEB) shall conform to the requirements of this SEB regardless of the trade name or trademark applied to the product.

Typical PWI Joist Identification Markings:

9-1/2 PRI-30 APA *EWS* PRI-400 PWC 1048 MM/DD/YY HH:MM HUD SEB 1132

DESIGN:

Design shall be in a accordance with HUD MPS, local building codes, allowable design properties provided in Table 2, and the requirements of the Pacific Woodtech Corporation *User's Guide.*

ABLE
DESIGN PRO ERTIES

Joist Series	Joist Depth	EI [2] [x 10^6 lbs-in^2]	k [3] [x 10^6 lbs]	M [4] [ft-lbs]	V [5] [lbs]	ER [6] [lbs]					IR [7] [lbs]				
						1-3/4"		3-1/2"		WS[8] Nails	3-1/2"		5-1/4"		WS[8] Nails
						no WS	WS	no WS	WS		no WS	WS	no WS	WS	
PWI-20	9-1/2" [9]	145	4.94	2520	1120	830	N.A.	1056	N.A.	4	1700	N.A.	N.A.	N.A.	4
	11-7/8" [9]	253	6.18	3265	1420	830	N.A.	1289	N.A.	4	1700	N.A.	N.A.	N.A.	4
PWI-30	9-1/2" [9]	161	4.94	3225	1120	945	N.A.	1081	N.A.	4	1905	N.A.	N.A.	N.A.	4
	11-7/8" [9]	280	6.18	4170	1420	945	N.A.	1314	N.A.	4	1905	N.A.	N.A.	N.A.	4
PWI-40	9-1/4"	181	4.80	2650	1080	1080	N.A.	1080	N.A.	4	2160	N.A.	N.A.	N.A.	4
	9-1/2" [9]	193	4.94	2735	1120	1080	N.A.	1111	N.A.	4	2160	N.A.	N.A.	N.A.	4
	11-7/8" [9]	330	6.18	3545	1420	1200	N.A.	1371	N.A.	4	2500	N.A.	N.A.	N.A.	4
	14" [9]	482	7.28	4270	1710	1200	N.A.	1472	1597	4	2500	N.A.	N.A.	N.A.	4
	16" [9]	657	8.32	4950	1970	1200	N.A.	1472	1799	4	2500	N.A.	N.A.	N.A.	4
PWI-50	9-1/2" [9]	186	4.94	3800	1120	1015	N.A.	1097	N.A.	4	2040	N.A.	N.A.	N.A.	4
	11-7/8" [9]	322	6.18	4915	1420	1015	N.A.	1330	N.A.	4	2040	N.A.	N.A.	N.A.	4
	14" [9]	480	7.28	5860	1710	1015	N.A.	1303	1389	4	2040	N.A.	N.A.	N.A.	4
	16" [9]	663	8.32	6715	1970	1015	N.A.	1303	1529	4	2040	N.A.	N.A.	N.A.	4
PWI-60	9-1/4"	218	4.80	3665	1080	1080	N.A.	1080	N.A.	4	2160	N.A.	N.A.	N.A.	4
	9-1/2" [9]	231	4.94	3780	1120	1080	N.A.	1111	N.A.	4	2160	N.A.	N.A.	N.A.	4
	11-7/8" [9]	396	6.18	4900	1420	1200	N.A.	1371	N.A.	4	2500	N.A.	N.A.	N.A.	4
	14" [9]	584	7.28	5895	1710	1200	N.A.	1472	1597	4	2500	N.A.	N.A.	N.A.	4
	16" [9]	799	8.32	6835	1970	1200	N.A.	1472	1799	4	2500	N.A.	N.A.	N.A.	4
PWI-70	11-7/8" [9]	440	6.19	6730	1420	1160	1420	1420	N.A.	4	2335	2767	2840	N.A.	4
	14" [9]	644	7.33	8030	1710	1160	1592	1615	1710	4	2335	2767	2870	3302	4
	16" [9]	873	8.42	9200	1970	1160	1592	1615	1970	4	2335	2767	2870	3302	4
	18"	1141	9.53	10355	2239	1160	1808	1615	2239	6	2335	3199	2870	3734	8
	20"	1447	10.63	11495	2506	1160	1808	1615	2263	6	2335	3199	2870	3734	8
PWI-93	11-7/8"	659	6.18	10315	1420	1280	N.A.	1389	N.A.	4	2760	N.A.	N.A.	N.A.	4
	14"	961	7.28	12305	1710	1280	N.A.	1490	1614	4	3020	N.A.	N.A.	N.A.	4
	16"	1301	8.32	14095	1970	1280	N.A.	1490	1817	4	3020	N.A.	N.A.	N.A.	4
PWI-77	9-1/2"	261	5.57	5155	1675	1390	1675	1675	N.A.	4	2780	N.A.	3350	N.A.	4
	11-7/8"	442	6.92	6675	1925	1390	1890	1885	1925	4	2780	3280	3395	3850	4
	14"	648	8.17	7960	2125	1390	1890	1885	2125	4	2780	3280	3395	3895	4
	16"	881	9.35	9120	2330	1390	1890	1885	2330	4	2780	3280	3395	3895	4
	18"	1152	10.55	10265	2535	1390	2140	1885	2535	6	2780	3780	3395	4395	8
	20"	1463	11.76	11395	2740	1390	2140	1885	2635	6	2780	3780	3395	4395	8
PWI-90	9-1/2"	392	5.57	7915	1675	1400	1675	1675	N.A.	4	3350	N.A.	3350	N.A.	4
	11-7/8" [9]	661	6.92	10255	1925	1400	1900	1900	1925	4	3355	3850	3850	N.A.	4
	14" [9]	965	8.17	12235	2125	1400	1900	1900	2125	4	3355	3855	3970	4250	4
	16" [9]	1306	9.35	14020	2330	1400	1900	1900	2330	4	3355	3855	3970	4470	4
	18"	1703	10.55	15780	2535	1400	2150	1900	2535	6	3355	4355	3970	4970	8
	20"	2155	11.76	17520	2740	1400	2150	1900	2650	6	3355	4355	3970	4970	8
	22"	2664	12.97	19245	2935	N.A.	2400	N.A.	2900	8	N.A.	4605	N.A.	5220	10
	24"	3232	14.18	20955	3060	N.A.	2400	N.A.	2900	8	N.A.	4605	N.A.	5220	10

Table 2 - Notes

1. The tabulated values are design values for normal duration of load. All values, except for EI and k, may be permitted to be adjusted for other load duration as permitted by the code.
2. Bending stiffness (EI) of the I-joist.
3. Coefficient of shear deflection (k). For calculating uniform load and center point load deflections of an I-joist in a simple-span application, use Equations 1 and 2.

   Uniform Load $$\delta = \frac{5wl^4}{384EI} + \frac{wl^2}{k} \quad (1)$$

   Center Point Load $$\delta = \frac{Pl^3}{48EI} + \frac{2Pl}{k} \quad (2)$$

   Where:

   δ = calculated deflection [in]
   w = uniform load [lbs/in]
   l = design span [in]
   P = concentrated load [lbs]
   EI = bending stiffness of the I-joist [lbs-in^2]
   k = coefficient of shear deflection [lbs]
4. Moment capacity (M) of the I-joist.
5. Shear capacity (V) of the I-joist.
6. End reaction capacity (ER) of the I-joist , for 1-1/2" and 3-1/2" bearing lengths, with and without web stiffeners (WS).
7. Intermediate reaction capacity (IR) of the I-joist, for 3-1/2" and 5-1/4" bearing lengths, with and without web stiffeners (WS).
8. Refer to Figure 1 for minimum nail dimensions.

- Design properties meet or exceed the requirements of the *PRI-400 Performance Standard for APA EWS I-Joists* for the corresponding joist series and depth.

SPAN TABLES:

Allowable clear spans for floor joists under typical residential loads are provided in Table 3. Additional floor and roof span tables are provided in the Pacific Woodtech Corporation *User's Guide.*

TABLE 3

ALLOWABLE RESIDENTIAL FLOOR JOIST SPANS

Joist Series	Joist Depth	Simple Span				Two or More Continuous Spans			
		12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
PWI-20	9-1/2"	16'-7"	15'-2"	14'-4"	13'-5"	18'-1"	16'-6"	15'-7"	13'-5"
	11-7/8"	19'-10"	18'-2"	17'-2"	16'-0"	21'-8"	19'-7"	16'-9"	13'-5"
PWI-30	9-1/2"	17'-1"	15'-8"	14'-9"	13'-10"	18'-7"	17'-0"	16'-1"	15'-0"
	11-7/8"	20'-5"	18'-8"	17'-8"	16'-6"	22'-3"	20'-4"	18'-10"	15'-0"
PWI-40	9-1/4"	17'-7"	16'-1"	15'-2"	14'-2"	19'-2"	17'-6"	16'-1"	14'-4"
	9-1/2"	18'-0"	16'-5"	15'-6"	14'-6"	19'-7"	17'-11"	16'-4"	14'-7"
	11-7/8"	21'-5"	19'-7"	18'-6"	16'-8"	23'-4"	20'-5"	18'-7"	16'-7"
	14"	24'-4"	22'-2"	20'-6"	18'-4"	25'-11"	22'-5"	20'-5"	18'-3"
	16"	26'-11"	24'-3"	22'-1"	19'-9"	27'-11"	24'-2"	22'-0"	19'-8"
PWI-50	9-1/2"	17'-10"	16'-3"	15'-4"	14'-4"	19'-5"	17'-8"	16'-8"	15'-7"
	11-7/8"	21'-4"	19'-6"	18'-4"	17'-2"	23'-2"	21'-2"	20'-0"	16'-1"
	14"	24'-3"	22'-2"	20'-11"	19'-6"	26'-6"	24'-2"	20'-2"	16'-1"
	16"	27'-0"	24'-8"	23'-3"	20'-2"	29'-5"	24'-3"	20'-2"	16'-1"
PWI-60	9-1/4"	18'-7"	17'-0"	16'-0"	14'-11"	20'-3"	18'-5"	17'-5"	16'-2"
	9-1/2"	18'-11"	17'-4"	16'-4"	15'-3"	20'-8"	18'-10"	17'-9"	16'-6"
	11-7/8"	22'-7"	20'-8"	19'-6"	18'-2"	24'-8"	22'-6"	21'-2"	19'-7"
	14"	25'-9"	23'-5"	22'-2"	20'-7"	28'-0"	25'-7"	24'-1"	19'-9"
	16"	28'-6"	26'-0"	24'-6"	22'-10"	31'-1"	28'-4"	24'-9"	19'-9"
PWI-70	11-7/8"	23'-4"	21'-3"	20'-1"	18'-8"	25'-5"	23'-2"	21'-10"	18'-6"
	14"	26'-6"	24'-2"	22'-9"	21'-2"	28'-10"	26'-3"	23'-2"	18'-6"
	16"	29'-3"	26'-8"	25'-2"	23'-1"	31'-11"	27'-10"	23'-2"	18'-6"
PWI-93	11-7/8"	26'-4"	23'-11"	22'-6"	20'-11"	28'-8"	26'-0"	24'-6"	21'-10"
	14"	29'-10"	27'-2"	25'-7"	23'-9"	32'-6"	29'-6"	27'-10"	23'-11"
	16"	33'-0"	30'-0"	28'-3"	25'-5"	36'-0"	32'-8"	30'-0"	23'-11"
PWI-77	9-1/2"	19'-8"	17'-11"	16'-11"	15'-9"	21'-5"	19'-6"	18'-4"	17'-1"
	11-7/8"	23'-4"	21'-4"	20'-1"	18'-9"	25'-5"	23'-2"	21'-10"	20'-4"
	14"	26'-6"	24'-2"	22'-10"	21'-3"	28'-11"	26'-4"	24'-10"	22'-0"
	16"	29'-4"	26'-9"	25'-3"	23'-6"	32'-0"	29'-2"	27'-6"	22'-0"
PWI-90	9-1/2"	22'-2"	20'-2"	19'-0"	17'-8"	24'-1"	21'-11"	20'-7"	19'-2"
	11-7/8"	26'-4"	23'-11"	22'-7"	21'-0"	28'-8"	26'-1"	24'-6"	22'-9"
	14"	29'-10"	27'-2"	25'-7"	23'-9"	32'-7"	29'-7"	27'-10"	25'-10"
	16"	33'-0"	30'-1"	28'-4"	26'-4"	36'-0"	32'-9"	30'-10"	26'-7"

1. Allowable clear spans with 10 psf dead load and 40 psf live load. Live load deflection is limited to L/480, where L is the span. Use alternate means to analyze continuous span joists if the length of any span is less than 40% of the length of an adjacent span.
2. Spans are based on glued and nailed sheathing. Adhesive shall meet APA Specification AFG-01 or ASTM D 3498. Spans shall be reduced 12 inches when the sheathing is nailed only.
3. The minimum bearing length shall be 1-3/4 inches at end supports and 3-1/2 inches at intermediate supports.
4. Web stiffeners are not required at supports when the joists are used at the spans and spacings given in this table, except as may be required by joist hanger manufacturers.

INSTALLATION:

PWI joists shall be limited to protected, dry conditions of use. Joist installation, including cutting to provide access holes for air ducts, plumbing, and wiring, shall be in accordance with HUD MPS, local building codes, and the details provided in the Pacific Woodtech Corporation *User's Guide*.

MANUFACTURING PLANT(S):

Components covered under this Bulletin will be produced in the following plant(s):

Pacific Woodtech Corporation
1850 Park Lane
Burlington, WA 98233
(360) 707-2200

The appropriate HUD Field Office or Homeownership Center in whose jurisdiction the manufacturing plant is located, or HUD designated representative will inspect this plant in accordance with prescribed procedures.

QUALITY CONTROL:

The appropriate HUD Field Office or Homeownership Center in whose jurisdiction the manufacturing plant is located, or the State Agency (in Category III states) shall review and approve plant fabrication procedures and quality control program, to ensure compliance with approved plans and specifications. The quality control program shall include field erection or supervision by Pacific Woodtech Corporation.

RECORD OF PROPERTIES:

The manufacturer shall provide HUD a list of the first ten properties in which the component or system described in this Bulletin is used. The list shall include the complete address, or description of location, and approximate date of installation or erection. Failure of the manufacturer to provide HUD with the above information may result in cancellation of this Bulletin.

NOTICE OF CHANGES:

The manufacturer shall inform HUD in advance of changes in production facilities, transportation, field erection procedures, design, or materials used in this product. Further, the manufacturer must inform HUD of any revision to corporate structure, change of address or change in name or affiliation of the prime manufacturer. Failure of the manufacturer to notify HUD of any of the above changes may result in cancellation of this Bulletin.

EVALUATION:

This SEB is valid for a period of three years from the date of initial issuance or most recent renewal or revision, whichever is later. The holder of this SEB shall apply for a renewal or revision 90 days prior to the Review Date printed on this SEB. Submittals for renewal or revision shall be sent to:

U. S. Department of Housing and Urban Development
FHA Standards, Office of Manufactured Housing Programs
451 Seventh Street, S.W., Room 9168
Washington, DC 20410-8000

Appropriate User Fee shall be sent to:

U. S. Department of Housing and Urban Development
Miscellaneous Income – Technical Suitability of Products Fees
Bank of America
P. O. Box 198762
Atlanta, GA 30384-8762

The holder of this SEB may apply for revision at any time prior to the Review Date. Minor revisions may be in the form a supplement.

If the Department determines that a proposed renewal or supplement constitutes a revision, the appropriate User Fee for a revision will need to be submitted in accordance with Code of Federal Regulations 24 CFR 200.934, "User Fee System for the Technical Suitability of Products Program", and current User Fee Schedule.

CANCELLATION:

Failure to apply for a renewal or revision shall constitute a basis for cancellation of the SEB. HUD will notify the manufacturer that the SEB may be canceled when:

conditions under which the document was issued have changed so as to affect production of, or to compromise the integrity of the accepted material, product, or system,
2. the manufacturer has changed its organizational form without notifying HUD, or
3. the manufacturer has not complied with responsibilities it assumed as a condition of HUD's acceptance.

However, before cancellation, HUD will give the manufacturer a written notice of the specific reasons for cancellation, and the opportunity to present views on why the SEB should not be canceled. No refund of fees will be made on a canceled document.

****

This Structural Engineering Bulletin is issued solely for the captioned firm and is not transferable to any person or successor entity.

****